Additional Exercises for Chapter 8 of the book: Coello Coello, Carlos A.; Van Veldhuizen, David A. & Lamont, Gary B. "Evolutionary Algorithms for Solving Multi-Objective Problems", Kluwer Academic Publishers, New York, ISBN 0-3064-6762-3, May 2002.

Exercises

1. Zitzler et al. [4] show that some of the metrics in current use are incompatible and discuss some of the possible consequences of this limitation. Relate the framework provided by the authors with multi-criteria decision making (MCDM). Do you see any relationship between Zitzler et al.'s results and Arrow's impossibility theorem [1] discussed in Section 4.4? Discuss.

2. Analyze Jin and Sendhoff's proposal [3] to incorporate fuzzy preferences into a multi-objective evolutionary algorithm (MOEA). Compare and contrast this proposal to Cvetkovic and Parmee's technique [2]. Discuss possible advantages and disadvantages of each of them.

References

[1] Kenneth Joseph Arrow. *Social Choice and Individual Values*. John Wiley, New York, 1951.

[2] Dragan Cvetković and Ian C. Parmee. Preferences and their Application in Evolutionary Multiobjective Optimisation. *IEEE Transactions on Evolutionary Computation*, 6(1):42–57, February 2002.

[3] Yaochu Jin and Bernhard Sendhoff. Incorporation of Fuzzy Preferences into Evolutionary Multiobjective Optimization. In *4th Asia-Pacific Conference on Simulated Evolution and Learning (SEAL'2002)*, Singapore, November 2002.

[4] Eckart Zitzler, Marco Laumanns, Lothar Thiele, Carlos M. Fonseca, and Viviane Grunert da Fonseca. Why Quality Assessment of Multiobjective Optimizers Is Difficult. In W.B. Langdon, E. Cantú-Paz, K. Mathias, R. Roy, D. Davis, R. Poli, K. Balakrishnan, V. Honavar, G. Rudolph, J. Wegener, L. Bull, M.A. Potter, A.C. Schultz, J.F. Miller, E. Burke, and N. Jonoska, editors, *Proceedings of the Genetic*

and Evolutionary Computation Conference (GECCO'2002), pages 666–673, San Francisco, California, July 2002. Morgan Kaufmann Publishers.